CC Technical Documentation
RM-11 Series Transceivers

Troubleshooting - GPS

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Troubleshooting – Global Positioning System (GPS) Engine

The RM-11 handset supports 800 AMPS and 800 CDMA / 1900 CDMA + GPS with IS 2000 capability. The RM-11 engine supports CDMA and GPS functionality for Enhanced 911 (E911) services.

GPS circuitry utilizes RF signals from satellites stationed in geosynchronous orbit to determine the latitude and longitude of the handset. The GPS circuitry and the cellular engine (CE) circuitry are completely separate in the handset. The GPS circuitry is located almost exclusively on the secondary side of the PWB, underneath the display module.

GPS General Block Diagram

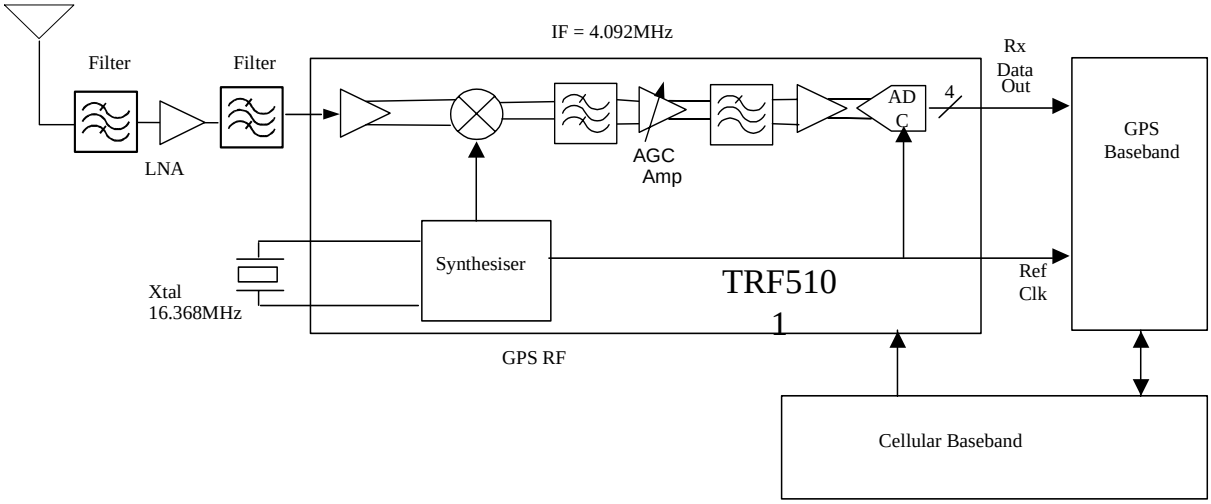

Figure 1: GPS general block diagram

GPS RF Schematic

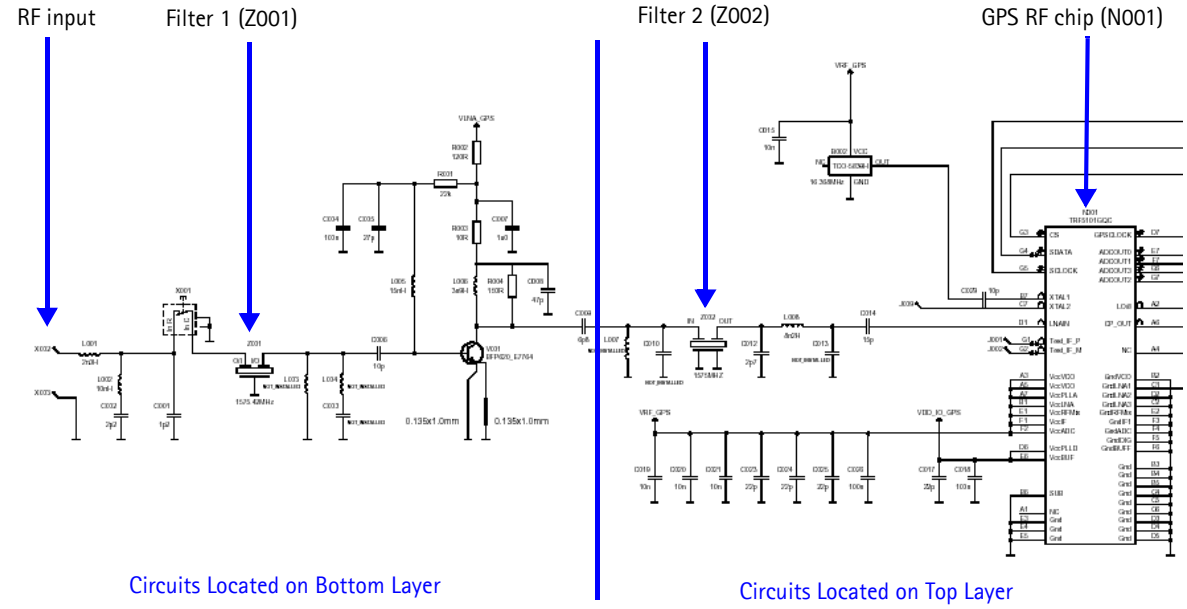

Figure 2: GPS RF schematic

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GPS Testing

1. Set Local Mode.

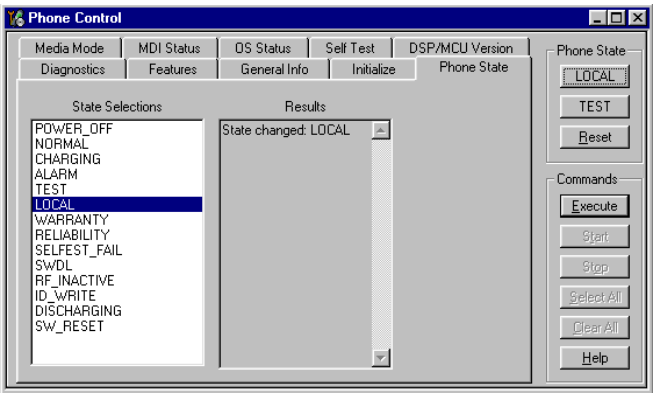

Figure 3: Phone Control dialog box

2. Inject -110dBm tone @ 1575.52MHz at GPS connector (X001) with a signal generator or call box.

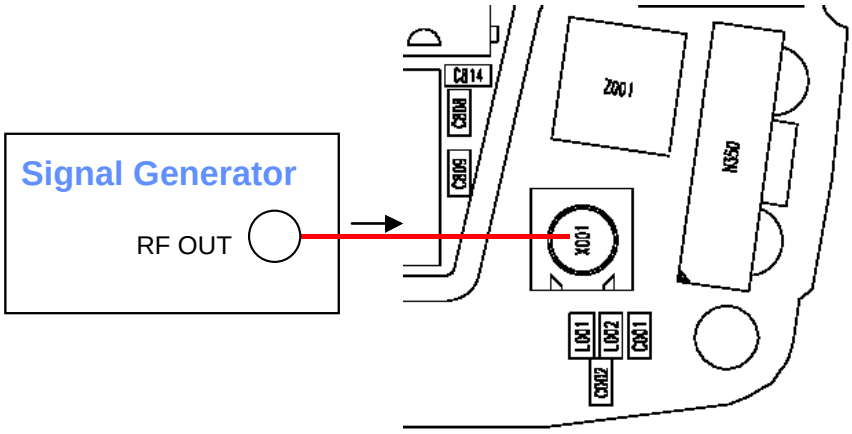

Figure 4: GPS connector (X001)

3. Open the **BB/Hwd** menu and select **GPS Control**.
4. Click the **Execute** button on the **GPS Control** dialog box to run a GPS quick test.

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5. Analyze the results of the GPS test in the **Test Steps** area.

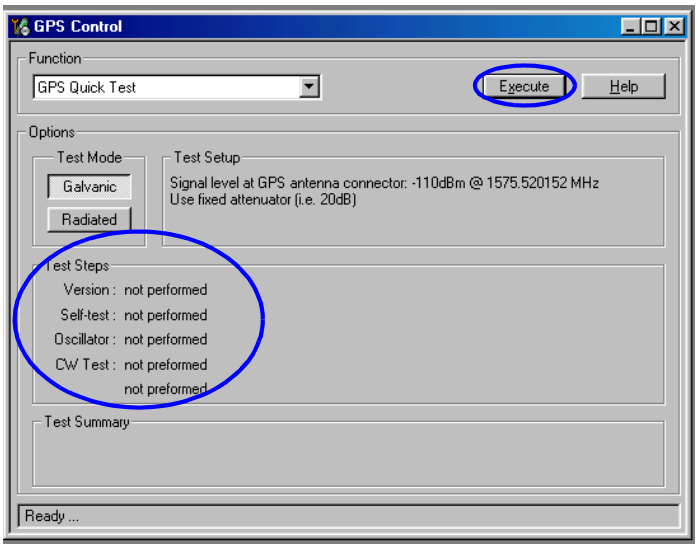

Figure 5: GPS Control dialog box

6. Self-Test Failure:
   - Repeat Steps 1-5 for first failure. If the test still fails, continue.
   - Inspect all GPS circuit elements around D051.
   - If pass visual inspection, then replace D051.

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7. Oscillator Failure:
   - Inspect all GPS circuit elements around D051.
   - If pass visual inspection, then replace B002.

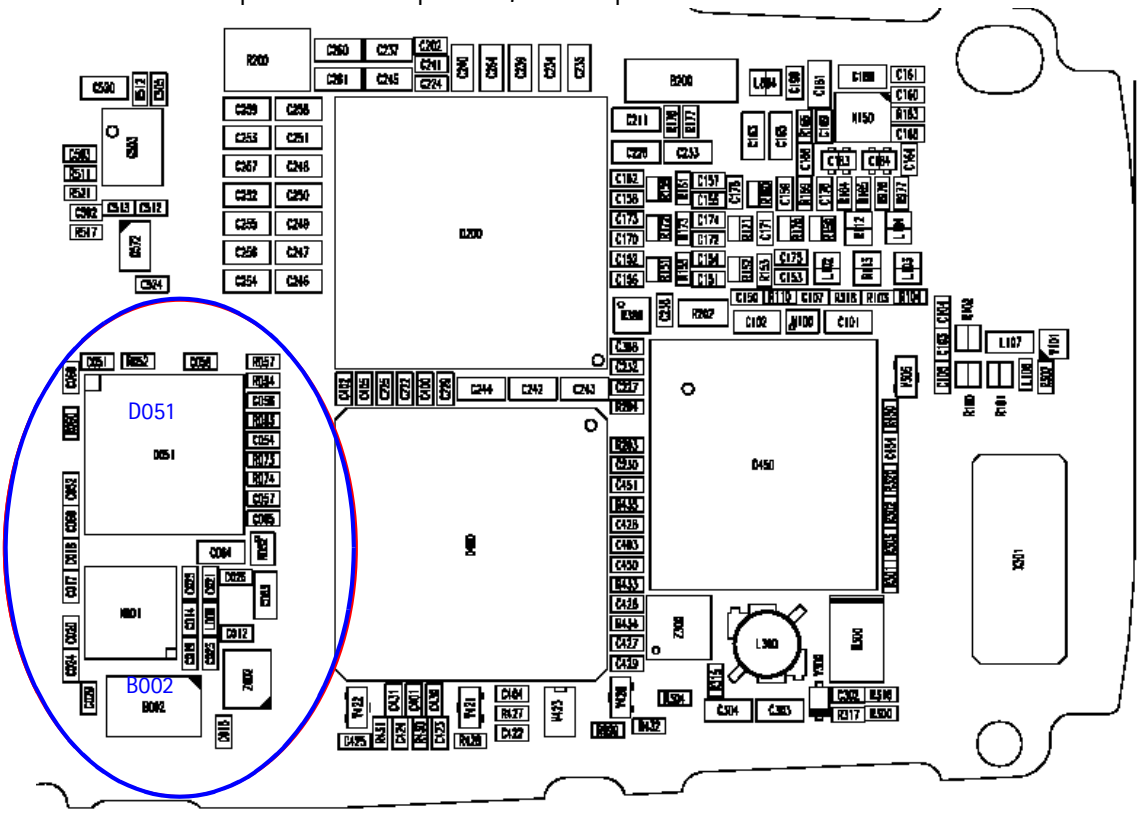

Figure 6: Component layout – top layer

8. CW Test Failure (see Figure 7):
   - Check that signal generator is on and sourcing a signal to the GPS RF input port (X001).
   - Inspect all GPS RF circuit elements.
   - Inspect all GPS circuit elements around D051.
   - If all visual inspection looks good, then replace GPS RF IC (N001).

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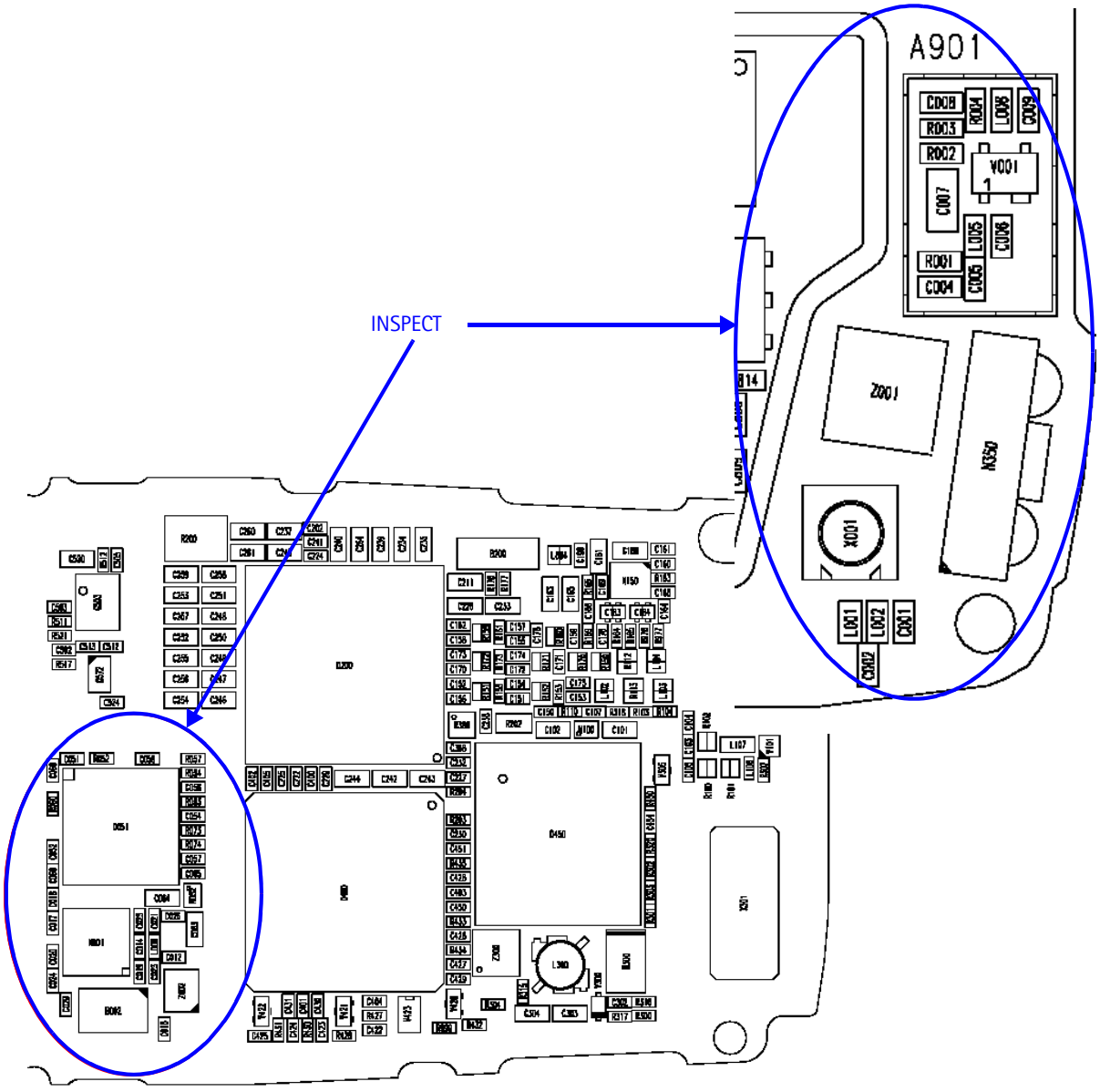

Figure 7: Inspection areas for CW test failure

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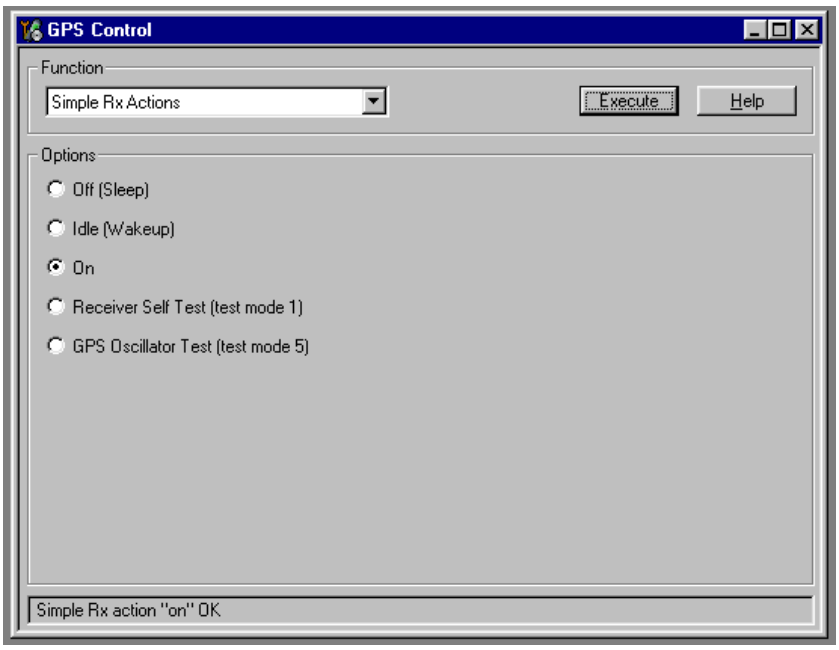
GPS RF Probing Setup

1. Turn on the GPS Receiver



2. Inject -25dBm tone @ 1575.52MHz at GPS Connector (X001) with signal generator or Call Box.

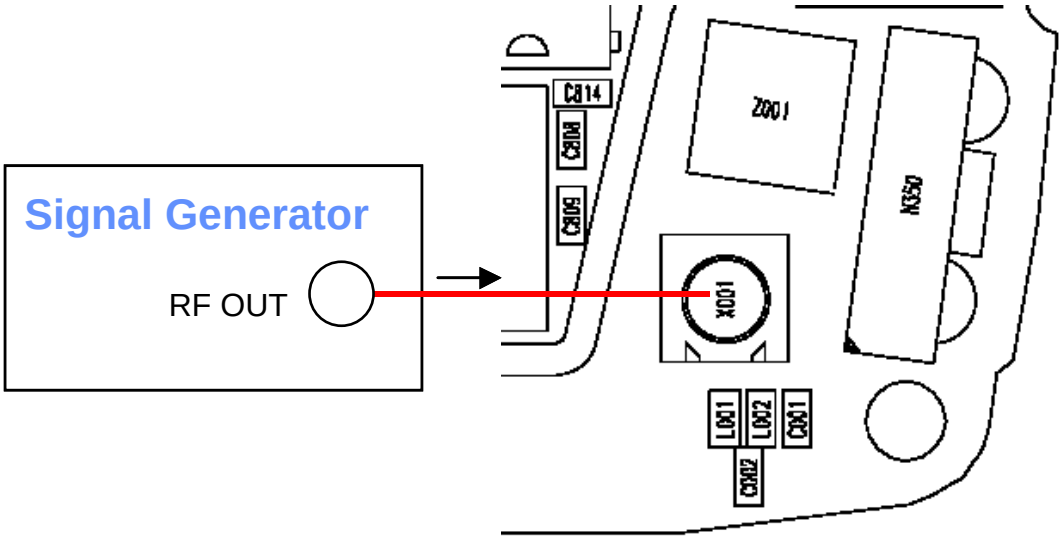


Figure 8: Signal generator RF OUT

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3. Measure probe points with either a FET probe and a spectrum analyzer set at center frequency 1575.25MHz, Span = 500kHz, or a voltmeter as specified. See Table 1 for measurement information that correspond to the test points in Figure 9.

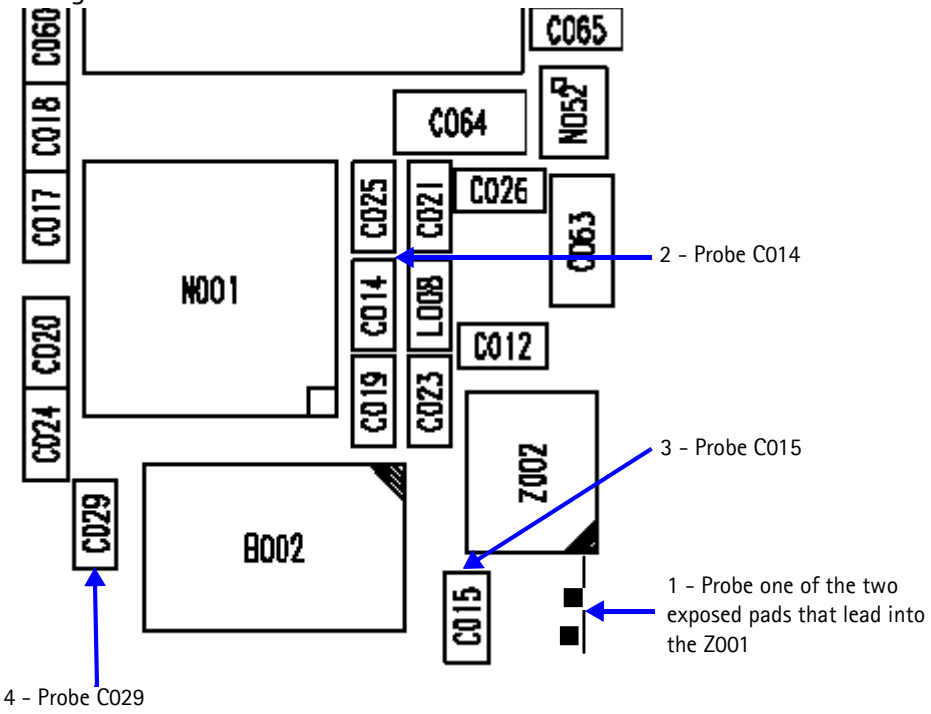

Figure 9: GPS RF probing measurements

Table 1 defines the test points shown in Figure 9.

Table 1: GPS RF test point information

Test Point	Description	Value	Instrument
1	LNA output	1575.25MHz @ -19.5dBm	spectrum analyzer
2	2nd BPF output	1575.25MHz @ -21dBm	spectrum analyzer
3	TXCO supply V_{RF_GPS}	2.78V (DC)	voltmeter
4	TXCO output freq	16.368MHz @ +6dBm	spectrum analyzer

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